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Snag Module
for the
Timberland Planning Component

California Department of Fish and Game
Northern California - North Coast Region
Interior Timberland Planning Team

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Resource Issue

Dead and dying trees are an essential component of forest ecosystems. Cavities found in snags, logs and dead portions of live trees provide reproductive and cover habitat for numerous species of wildlife. Dead wood provides excellent habitat for invertebrates and fungi, two key food sources for many wildlife. Dead wood also sustains forest productivity by contributing to soil content and structure. Diseased and dying trees are often characterized by deformities that augment forest structure and support wildlife habitat. Snags and wind thrown trees in riparian areas enhance in-stream habitat by providing sources of large woody debris.

Forest management has the potential for degrading functional wildlife habitat by interrupting the ecosystem processes that produce dead and dying trees. Short rotation even-aged management and frequent-entry uneven-aged silviculture that prioritizes the “capture” of mortality can remove existing snags and wildlife trees and substantially reduce the recruitment pool for future snags and terrestrial large woody debris. Fire suppression and intensive timber management have altered catastrophic fire/insect/drought/disease disturbance regimes, further altering the spatial and size distribution of snags on the landscape. A historical emphasis on safety and unimpeded fish passage has led to widespread removal of “hazard” snags and large woody debris in aquatic systems.

Recruiting and retaining adequate quantities of snags may be a good way to manage for functional wildlife habitat provided by dead and dying trees. By managing for snags, a landowner may also maintain the diseased and dying trees that become snags and the necessary large woody debris for both terrestrial and aquatic systems. Large snags (e.g., larger than, 16, 20, 24 and 30 inches dbh) are disproportionately important, because they provide bigger cavities higher off the ground and they decay slower. Height, decay class and tree species are other important factors to consider. Many researchers (Bull and Maslow 1977, Thomas et al. 1979, Raphael and White 1984, Nietro et al. 1985,

Li and Martin 1991, Lundquist and Mariani 1991, Conway and Martin 1993) believe that evenly distributed clumps of snags across the landscape will provide for optimal numbers and long term viability of snag dependent wildlife.

Although the creation of snags is highly stochastic, the natural low to medium severity fire disturbance regime for interior California forests historically resulted in a landscape scale dynamic equilibrium in which large snags were relatively well distributed across the landscape. In contrast, the pattern of fire suppression and intensive forest management described in the preceding paragraph has led to significantly different conditions. On one hand, timber management has systematically reduced the abundance of snags and their recruitment source on some areas of the landscape. At the same time, the shift towards high-severity disturbance regimes has greatly increased the density of mostly small diameter snags in other areas. It is likely that this trend (e.g., too many small snags in some places/not enough large snags in other places) has adversely impacted the overall quality of wildlife habitat on the landscape.

Goals

- Maintain the functionality of dead and dying trees in providing quality wildlife habitat on private timberlands
- Incrementally restore conditions on private timberlands so that densities of large snags increase and are more uniformly dispersed than exist in many cases
- Encourage private landowners to proactively take greater responsibility for snag planning in cooperation with the Interior Timberland Planning Team (Team) thereby alleviating the need for greater regulatory control in the future

Objectives

- Identify regionally or ecologically stratified levels and targets for measurable snag densities and spatial distribution by diameter class
- Identify regionally or ecologically stratified snag level thresholds for triggering special planning measures aimed at expediting movement towards the targets
- Identify appropriate scales for measuring snag densities and assessing density and spatial distribution targets
- Encourage companies to incorporate uniform and statistically meaningful snag data into their recurrent forest inventories
- Assist companies in the development of snag planning documents
- Initiate a research process that leads to a model correlating snag levels to wildlife utilization
- Develop a process for monitoring implementation of planning documents and progress towards targets, and for adapting thresholds, targets and planning documents based on the monitoring

Strategic Plan

The Team would initiate a process for developing a model that correlates snag levels to wildlife utilization. Retrospective analyses of historical data (e.g., Blodgett Forest) may be useful. Alternatively, study plots could be cooperatively established on timber company lands. The time span for developing the model would be 1 to 5 years. The modeling results could be used to evaluate timber company snag management goals.

The Team will also engage the companies separately to cooperatively develop planning documents detailing the methods and measures companies would take for achieving snag targets chosen by the companies. Planning documents could be used to better inform the review of snag issues in THPs, or the companies could receive concurrence from the Team for using the documents for programmatic review in THPs. The following criteria would be used for evaluating the sufficiency of the planning document:

- snag density/distribution targets that are stratified and assessed at the forest type, management tract or planning watershed scale
- statistically-based snag inventory at the appropriate scale(s) for reporting current densities and distributions, and assessing progress towards targets
- set of planning measures for achieving and maintaining targets
- thresholds for triggering special planning measures in snag deficient areas
- reporting and monitoring provisions
- conditions for programmatic versus THP specific review
- provisions for periodic review and adaptation of the planning document targets and thresholds (e.g., every 5 years).
- Snag targets with respect to current inventory levels are reasonable

Monitoring

The Team would track implementation of planning documents through random and focused field visits. This information would be supplemented by timber company annual reporting. For each snag planning document, the Team would need to develop a monitoring plan addressing the following items:

- list of items to be reported annually by a company
- list of items to monitored by the Team
- sampling design and protocol for each monitoring item

At the end of its first implementation period (e.g., 5 years), a company could be asked to report on the implementation of a snag planning document. At a minimum, the technical information contained in this report would need to include updated snag inventory data and a quantitative accounting of planning measure implementation.

Adaptive Management

Adaptive management will be an important component of snag management plan implementation. Through monitoring by the Team and reporting by the timber companies, the progress status will be compared to goals set forth in the snag management plan. Goals may need to be re-visited and modified as appropriate. Also, future snag management plans will incorporate any necessary revisions, updated and revised scheduling, standards, and goals.

Measures of Success

Success will be measured by the extent to which the following are met:

- Establishment of a working relationship with a large timber company
- Development of company specific planning documents that address snag issues
- Team and timber companies develop agreements for using a planning document to provide programmatic review for THPs in regard to snag issues
- Team develops and implements a monitoring program capable of tracking implementation of company planning documents
- Company is implementing planning document
- Review and adaptation of company planning documents at the five-year point
- Collaborative development of a model that correlates snag levels to wildlife habitat

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